MCU-Y6NEE
MCU-Y4NEE
MCU-Y4NEE1

MCU
installation manual

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Safety precautions

The safety information and precautions below must be kept for the safety of users and installers.

Before installing an air conditioner, please read this manual thoroughly to ensure that you know how to safely and efficiently install a new appliance.

✳ DVM PLUS Ⅳ air conditioner uses R410A refrigerant.
- When using R410A, moisture or foreign substances may affect the capacity and reliability of the product. Safety precautions must be taken when installing the refrigerant pipe.
- The designing pressure of the system is 4.1MPa. Select appropriate material and thickness according to the regulations.
- R410A is a quasi-azeotrope of two refrigerants. Make sure to charge with liquid phase when filling refrigerant. If you charge gaseous refrigerant, it may affect the capacity and reliability of the product as a result of change formation of the refrigerant.

✳ Connect the indoor units for R410A refrigerant. Check whether the indoor units can be connected with the product's catalogue. (When incorrect indoor units are connected, they cannot operate normally.)

❉ After installation and trial operation, explain to the customer how to use the air conditioner and give the installation manual to the user.

❉ The manufacturer is not responsible for accidents due to incorrect installation. Any claims caused by failing to keep the safety precautions are installer's responsibility. (The installer is responsible for the service cost.)

⚠ WARNING	In case of not following the safety precautions, the service agent or the user may get the risk of serious wound or death.
⚠ CAUTION	In case of not following the safety precautions, the service agent or the user may get the risk of injury or loss of property.

FOR INSTALLATION ⚠ WARNING

Installation must be done by the installer or its service agent.
- ▶ Installation by an unqualified person may cause a water leakage, electric shock or fire and so on.

Install the unit correctly according to the installation manual.
- ▶ An incorrect installation may cause a water leakage, electric shock or fire.

When installing the unit in a small place, take measures in order to keep the refrigerant concentration from exceeding allowable safety limits in the event of a refrigerant leak.
- ▶ Excessive refrigerant concentration can lead to suffocation.

If any gas or impurities except R410 refrigerant get into the refrigerant pipe, serious problems may occur and this may cause injury.

When installing the unit, only use the components and tools which are specified for the installation.
- ▶ Using the uncertified components and tools may cause a unit fall, water leakage, electric shock, and a fire. (Never use the components and pipe for R22 refrigerant)

Install the unit safely on a place that can support its weight.
- ▶ If the place cannot support its weight, the unit may fall down and cause injury.

Check out the safety precautions below before installing or fixing the unit.
- ▶ Before welding the unit, you must remove all the hazardous materials around the unit that may cause an explosion and a fire.
- ▶ When refrigerant is in the product or the pipe before welding the unit, you must remove the refrigerant.
  - If you weld the unit when there is refrigerant inside, the increased pressure of refrigerant may explode or break the leaking spot so that causes serious injuries.
- ▶ When welding the unit, please use nitrogen gas to prevent oxide from generating in the pipe

Make sure to cut off all the power supply before installing, fixing, and cleaning the unit.

When the electric wire is damaged, you must exchange it by the manufacturer or its service agent, or a person who has the equivalent qualification.

When turning on the power, make sure to connect the power supply to the circuit breaker designated for indoor units. (ELCB, ELB, MCCB)
- ▶ If you do not install the circuit breaker for MCU(ELCB, ELB, MCCB), excessive current or failure to blocking the power supply may cause electric shock, a fire.

Safety precautions

FOR INSTALLATION | ⚠ WARNING

Make sure to connect wires thoroughly and fix them firmly so that no outer pressure of the wires would put on the terminal block.

▶ If the terminal is loose, it may generate heat and cause a fire.

Supplied power should be more or less than 2% of the rated power.

▶ If the power is supplied unevenly, a life span of the storage battery shortens. If the supplied power is more than 4 % of the rated power, the unit terminates and indicates errors to protect it.

Make sure the interior power supply shouldn't be over the maximum voltage or under the minimum voltage.

▶ Otherwise, it could result in malfunction of the unit due to damaged electrical components or decreased function of components.

Only use copper wire as the power cable and all wiring, components and materials should comply with the applicable local and national codes.

Make sure that all wiring is properly installed.

▶ Otherwise, the unit can be heated and cause a fire.

Never use the pipe and flare parts for R22 refrigerant.

In case of a refrigerant gas leakage during installation, please ventilate the area.

▶ If refrigerant gas combines with inflammable materials, toxic gases can be generated.

The electric work must be done by service agent or qualified persons according to national wiring regulations and use only rated cable.

▶ Voltage drop, shortage of power supply, improper electric work and using unapproved wires can cause an electric shock or a fire.

FOR INSTALLATION | ⚠ CAUTION

Make sure to earth.

▶ Do not connect the earth wire to the gas pipe, lighting rod or telephone wire.

▶ If earthing is incomplete, electric shock or fire may occur.

Make sure that the condensed water from the drain hose runs out properly based on this installation manual and insulate the drain pipe so that frost does not generate.

▶ If the draining work is done incompletely, property damage may occur due to a leakage.

Install the power cable and communication cable of MCU at least 1m away from the electric appliances and at least 2m away from the lightning rod.

▶ However, you may hear a noise 1 meter away from the unit depending on the condition of the electric wave.

Install MCU away from lighting apparatus using the ballast.

▶ If you use the wireless remote control, it may not operate normally.

Do not install the unit in following places.

▶ **The place packed with mineral oil and the place where there are lots of moisture, or arsenic acid:**
The resin parts may burn and cause the fall of the components or a refrigerant leakage.

▶ **The place where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet:**
The copper pipe or connection pipe may corrode and refrigerant may leak.

▶ **The place where there is a machine that generates electromagnetic waves:**
The unit may not operate normally due to malfunction in the control system.

▶ **The place where there is a possibility of combustible gas leakage, and where inflammable materials like thinner or gasoline is handled. The place where a carbon fiber or inflammable dust is floating in the air:**
If the gas leaks and stays around the main valve, it may result in a fire.

▶ **The places where have a possibility of the MCU corrosion like a spa and a shore.**

When there is a possibility that the place in which MCU is installed could be the shelter of small animals, take proper measures to prevent this situation in advance.

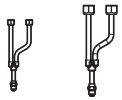
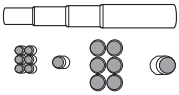
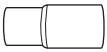
▶ If small animals contact the unit, this may result in malfunction of the unit or cause a fire and smoke. Please remind users of cleaning the place around MCU.

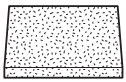
❊ Any claims caused by failing to keep the safety precautions are installer's responsibility.
(The installer is responsible for the service cost.)

Preparing the installation

Accessories

Please check if items below are included in installation accessories.

Name	Y-connector(Φ9.52,Φ15.88)	Pipe socket	Drain socket
Shape			

Name	Insulation (for pipe)	Insulation (for base)	Installation manual	Pattern sheet	Cable tie
Shape					

Selecting the refrigerant pipe for installation

The design pressure of MCU for R410a is about 4.1 MPa. For safe use of the product, please refer to the table below in selecting the installation pipe.

Outer diameter [mm]	Minimum thickness [mm]	Material
ø6.35	0.7	C1220T-O
ø9.52	0.7	
ø12.70	0.8	
ø15.88	1.0	
ø19.05	0.9	C1220T-1/2H or C1220T-H
ø22.23	0.9	
ø25.40	1.0	
ø28.58	1.1	
ø31.75	1.1	
ø38.10	1.35	
ø44.45	1.6	
ø50.80	2.0	

CAUTION

- Make sure to use C1220T-1/2H(Semi-hard) material for pipes larger than Ø19.05mm.
  In case of using C1220T-O(soft) pipe for ø19.05mm, pipe may be broken, which can result in an injury.

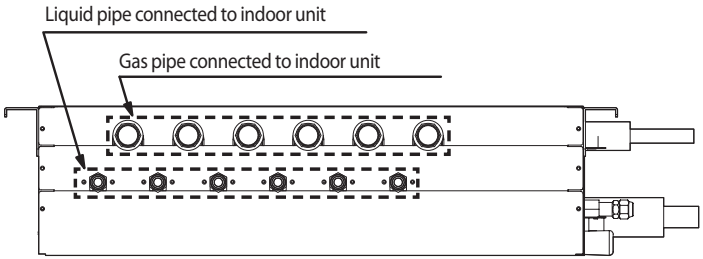
Preparing the installation

MCU indoor/outdoor unit compatible table

Before installing MCU, refer to the compatible table below and find the model before installation.

<table>
<tr><th>Outdoor Unit</th><th>MCU</th><th>Indoor Unit</th></tr>
<tr><td rowspan="2">RD✳✳✳HRXGA✳</td><td>MCU-Y6NEE
MCU-Y4NEE</td><td>AVXC✳✳✳✳✳✳✳
AVXW✳✳✳✳✳✳✳
AVXT✳✳✳✳✳✳✳
AVXD✳✳✳✳✳✳✳</td></tr>
<tr><td>MCU-Y4NEE1</td><td>ND200/220/280 ✳✳✳✳✳✳✳</td></tr>
</table>

	Model	Description
MCU Kit	MCU-Y6NEE	Below 6 indoor units, below 46.4kW
	MCU-Y4NEE	Below 4 indoor units, below 46.4kW
	MCU-Y4NEE1	Below 2 large capacity ducts, below 46.4kW

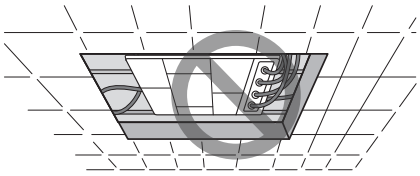


<Side view of MCU>

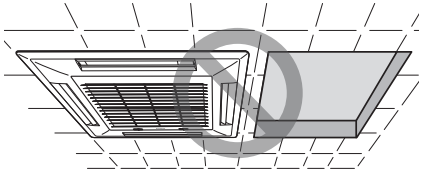
Space requirements

1. **Since refrigerant noise can be generated during the MCU operation, do not install the unit on the ceiling of the places that requires silence such as bedrooms, libraries, hospitals and offices etc.**

2. **Do not install the MCU in the ceiling of the living area. Otherwise, noise generated from the MCU may disturb people in that area and cause inconvenience.**

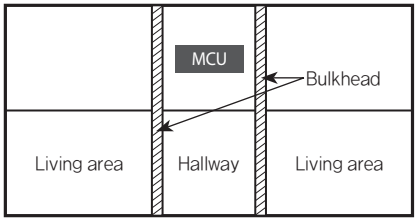


<Spaces with developed ceiling>

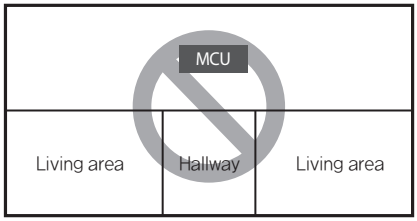


<Ceiling of the office>

3. **It is normally recommended to install MCU in a hallway but a bulkhead should be installed to minimize the noise from being transferred to living area. (Refer to the below figure)**



<There is no risk of noise transfer>



<There is a risk of noise transfer>

- ❉ Soundproof and soundproofing materials
- ▶ The place where MCU is installed and the interior walls should have a high soundproof ability. (Bricks, Concretes, Cement)
- ▶ The ceiling where MCU is installed should be coated with quality Tex that has a good soundproof function.
- ▶ Minimize the size of the hole between the walls and the pipe connection. After the installation, block the gap to prevent noise from leaking.

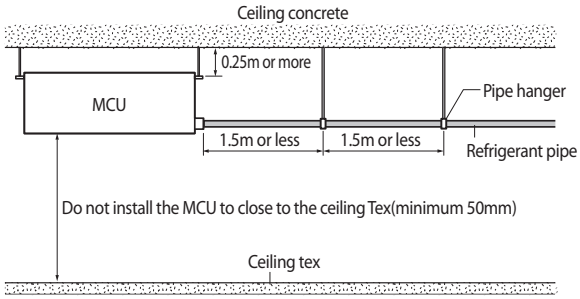
4. **Secure over 0.25m of space when MCU is being fixed to the concrete of the ceiling.**

5. **MCU may generate noise so don't install it too close to the ceiling Tex.**

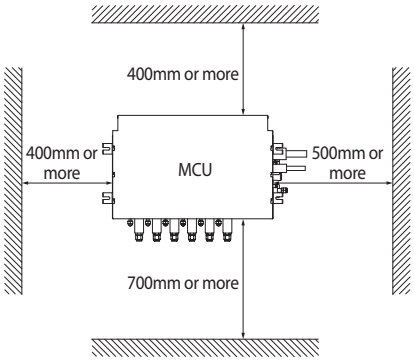
6. **Each pipe hanger should be placed at 1.5m interval to support its weight firmly.**
   If the pipe or the hanger isn't fixed firmly, the unit may fall and cause a property damage or loss of life.

Space requirements

7. Select the place where MCU supporting structure can support the weight of the indoor unit and have strong vibration resistance without any slope.
(If the structure is not strong enough, MCU may fall down and break, which can cause injury to your body.)

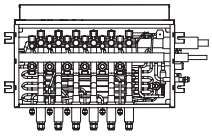
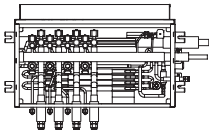
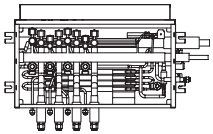


8. Select a place with enough space for repairing and services.
(Leave enough space between sidewalls in installation.-refer to the picture below)

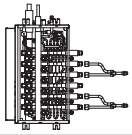
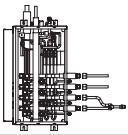
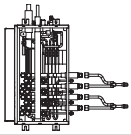


Installing the unit

1. MCU specification

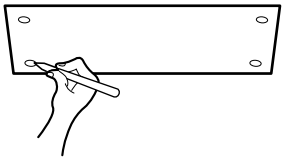
Model	MCU-Y6NEE	MCU-Y4NEE	MCU-Y4NEE1
The exterior of MCU			
Number of connectable indoor units	Up to 6 units	Up to 4 units	Up to 2 units Only for large capacity duct (20.0kW↑)
The maximum capacity of the connectable indoor units	44.8kW	44.8kW	56.0kW
Internal EEV	Not included Cannot connect indoor unit without internal EEV.		

2. Installing the indoor unis

Model	MCU-Y6NEE	MCU-Y4NEE	MCU-Y4NEE1
Example installing			
Installing indoor units	Under 10.0kW indoor unit : Don't use Y-connector 11.2kW ~ 14.0kW indoor unit : Use Y-connector at the Gas & Liquid Line ❉ Can not connect to large capacity duct (20.0kW Over)		Large capacity duct unit : Use Y-connector at the Gas & Liquid Line ❉ Only for large capacity duct (20.0kW Over)

3. Preparation before installation.

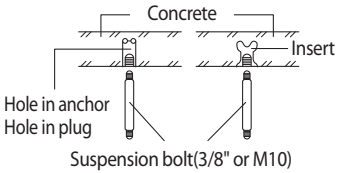
1) Place the pattern sheet on the ceiling at the spot where you want to install the indoor unit.



NOTE

- Since the diagram is made of paper, it may shrink or stretch slightly due to temperature or humidity. For this reason, before drilling the holes maintain the correct dimensions between the markings.

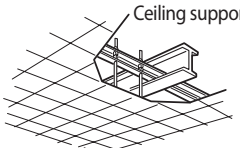
2) Insert bolt anchors, use existing ceiling supports or construct a suitable support as shown in figure.



3) Install the suspension bolts depending on the ceiling type.

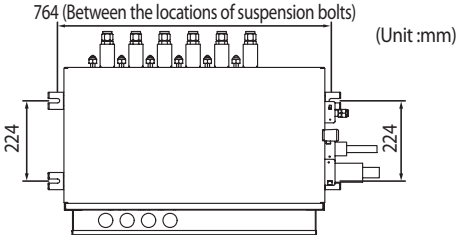
CAUTION

- Ensure that the ceiling is strong enough to support the weight of the indoor unit. Before hanging the unit, test the strength of each attached suspension bolt.
- If the length of suspension bolt is more than 1.5m, it is required to prevent vibration.
- If this is not possible, create an opening on the false ceiling in order to be able to use it to perform the required operations on the indoor unit.

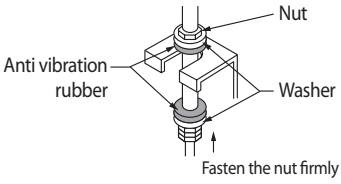


4. Cautions about MCU installation.

- ▶ When fixing the unit at the upper place using suspension bolts, use a nut and washer to vertically fasten the unit.
- ▶ There are four spots to fix the suspension bolts. Make sure every spot is fixed.
- ▶ The upper and the lower side of MCU is distinguished, so be careful not to turn the unit upside down when installing the unit. Otherwise, noise may be generated or the product may be damaged.



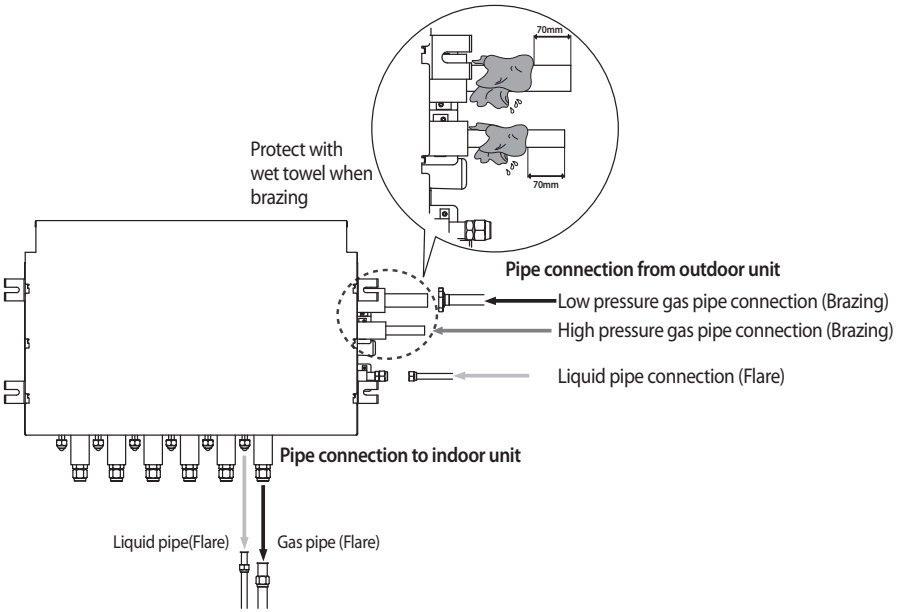
<Location and intervals of fixed suspension bolts>



<Fixing the bolt>

Installing the unit

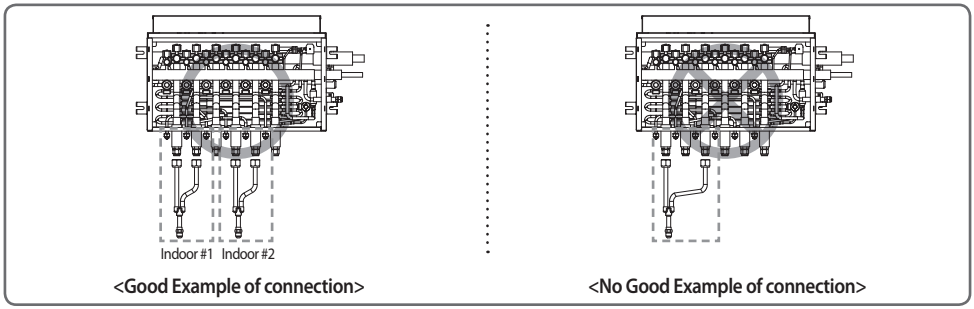
5. How to connect the pipe line.



- ❉ When installing MCU, use the pattern sheet for installation that is provided with the product.
- ❉ When brazing the high / low pressure gas pipe, protect the product with the flame-proof sheet.

6. How to connet Y-connector

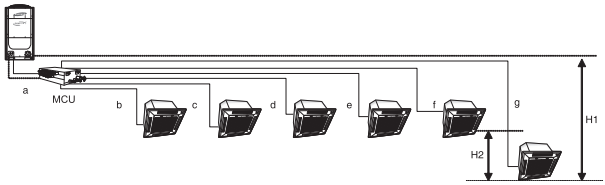
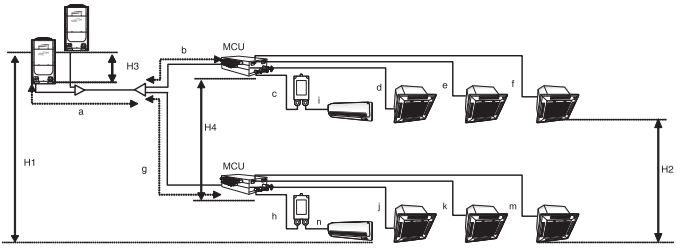
▶ In case of connecting one indoor with Y-Connector to MCU, Y-Connector must be connected in series.

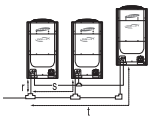


Refrigerant piping works

- For installation of the refrigerant pipes, please refer to corresponding outdoor unit installation manual.
- Since R410a has a high working pressure, only use the regulated refrigerant pipe and follow proper installation method.
- Finish the gas pipe and the liquid pipe works with the insulation base. If the insulation work isn't done properly, condensation water may flow indoor and part of the ceiling can be damaged by heat.
- In brazing the pipe, please follow the prescribed brazing method. (Please refer to outdoor unit installation manual)

Refrigerant pipe installation

Method	Branch with Y-joint
Using MCU only	
Using Y- joint and MCU	

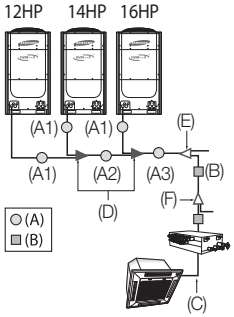
Items				Examples		Remarks
Max. piping length	Outdoor ~ Outdoor unit	Piping (Equivalent piping)	200m below (220m below)	Using MCU only	a+b+c+d+e+f+g ≤ 200 m (220m)	Equivalent pipe length. Y joint : 0.5m, Header : 1m, MCU : 1m
				Using Y-joint and MCU	a+g+m ≤ 200 m (220 m)	
		Total piping	1000m below	Using MCU only	a+b+c+d+e+f+g ≤ 1000 m	
				Using Y-joint and MCU	a+b+c+d+e+f+g+p+h+i+j+k+m+n ≤ 1000 m	
		Piping	10 m below	r ≤ 10, s ≤ 10, t ≤ 10 m		
		Equivalent piping	13 m below	r ≤ 13, s ≤ 13, t ≤ 13 m		
Level difference	Outdoor ~ Indoor unit	Piping	50 m / 40 m*1)	H1 ≤ 50/40 m		
	Indoor ~ Indoor unit	Piping	15m below	H2 ≤ 15 m		
	Outdoor ~ Outdoor unit	Piping	5m below	H3 ≤ 5 m		
	MCU~MCU	Piping	15m below	H4 ≤ 15 m		
Allowable length after branch	The first branch ~ the farthest Indoor unit	Piping	45 m below	Using MCU only	45 m	
				Using Y-joint and MCU	g+m ≤ 45 m	

*1) As an outdoor unit is located in a lower position than indoor unit, level difference is 40m.

Refrigerant piping works

Selecting the refrigerant pipe

When selecting the refrigerant pipe, refer to the table below. (The amount of additional MCU refrigerant : 0.5 Kg)



• Example) 42HP of compact combinations

HP	Mark	Pipe size (O. D.mm)		
		Liquid	Low gas	High gas
12	(A1)	Ø12.70	Ø25.40	Ø22.23
14	(A1)	Ø12.70	Ø25.40	Ø22.23
16	(A1)	Ø12.70	Ø28.58	Ø22.23
26	(A2)	Ø19.05	Ø31.75	Ø28.58
42	(A3)	Ø19.05	Ø38.10	Ø31.75

Outdoor unit connection pipe size : (A1), (A2), (A3)

A1 : Select the pipes according to the outdoor unit capacity with following table.

A2 : Select the pipes according to sum of outdoor unit capacities behind the outdoor joint with following table.

A3 : Select the main pipe of outdoor units with the following table.

Outdoor unit	Pipe size (O.D. mm), (A)			Oil balancing pipe size
	Liquid	Gas	High gas	
8HP	Ø9.52	Ø19.05	Ø15.88	Ø6.35
10HP		Ø22.23	Ø19.05	
12HP	Ø12.70	Ø25.40	Ø22.23	
14HP				
16HP	Ø15.88	Ø28.58	Ø25.40	
18HP				
20HP				
22HP				
24HP				
26~30HP	Ø19.05	Ø31.75	Ø28.58	
32~34HP				
36~48HP		Ø38.10	Ø31.75	
50~60HP	Ø22.23	Ø44.45	Ø38.10	

*A1 : Pipes to the outdoor unit (Liquid, Gas, High pressure gas)
*A2 : Pipes between outdoor joint kits (Liquid, Gas, High pressure gas)
*A3 : Main pipes (Liquid, Gas, High pressure gas)

Pipe size between branch joints : (B)

Select the pipe size according to the capacity sum of indoor units which are connected below this pipe.

Total indoor unit's capacity	Pipe size (O.D. mm)		
	Liquid	Gas	High gas
15.0 kW and below	Ø9.52	Ø15.88	Ø15.88
Over 15.0~23.2 kW and below		Ø19.05	
Over 23.2~29.0 kW and below	Ø12.70	Ø22.23	Ø19.05
Over 29.0~40.6 kW and below		Ø25.40	Ø22.23
Over 40.6~46.4 kW and below		Ø28.58	
Over 46.4~69.6 kW and below	Ø15.88		Ø25.40
Over 69.6~98.6 kW and below	Ø19.05	Ø31.75	Ø28.58
Over 98.6~139.2 kW and below		Ø38.10	Ø31.75
Over 139.2 kW	Ø22.23	Ø44.45	Ø38.10

Pipe size between branch joints and indoor unit : (C)

Select the pipe size according to the indoor unit's capacity.

Indoor unit's capacity	Pipe size (O. D. mm)	
	Liquid pipe	Gas pipe
2.2~5.6 kW	Ø6.35	Ø12.70
7.1~14.0 kW	Ø9.52	Ø15.88

Branch joint : (D), (E), (F)

■ Branch joint of outdoor unit's multi connection (D)

	Model	Capacity of outdoor
Liquid & Low gas pipe	MXJ-T3819✳	Below 48 HP
	MXJ-T4422✳	Above 50 HP
High gas pipe	MXJ-T3100✳	Below 48 HP
	MXJ-T3800✳	Above 50 HP

■ First branch joint (E)

Select branch joint according to outdoor unit's capacity.

	Outdoor unit	Model
Liquid & Low pressure gas Y-joint (E)	8 ~ 14 HP	MXJ-YA2512✳
	16 HP	MXJ-YA2812✳
	18 ~ 24HP	MXJ-YA2815✳
	26 ~ 34HP	MXJ-YA3119✳
	36 ~ 48HP	MXJ-YA3819✳
	50 ~ 60HP	MXJ-YA4422✳

	Outdoor unit	Model
High pressure gas Y-joint (E)	8 HP	MXJ-YA1500✳
	10 ~ 24 HP	MXJ-YA2500✳
	26 ~ 48 HP	MXJ-YA3100✳
	50 ~ 60HP	MXJ-YA3800✳

■ Branch joint (F)

	Model	Total indoor unit's capacity
Liquid & low pressure gas Y-joint (F)	MXJ-YA1509✳	15.0 kW and below
	MXJ-YA2512✳	Over 15.0~40.6 kW and below
	MXJ-YA2812✳	Over 40.6~46.4 kW and below
	MXJ-YA2815✳	Over 46.4~69.6 kW and below
	MXJ-YA3119✳	Over 69.6~98.6 kW and below
	MXJ-YA3819✳	Over 98.6~139.2 kW and below
	MXJ-YA4422✳	Over 139.2 kW

	Model	Total indoor unit's capacity
High pressure gas Y-joint (F)	MXJ-YA1500✳	23.2 kW and below
	MXJ-YA2500✳	Over 23.2 ~ 69.6 kW and below
	MXJ-YA3100✳	Over 69.6 ~ 139.2 kW and below
	MXJ-YA3800✳	Over 139.2 kW

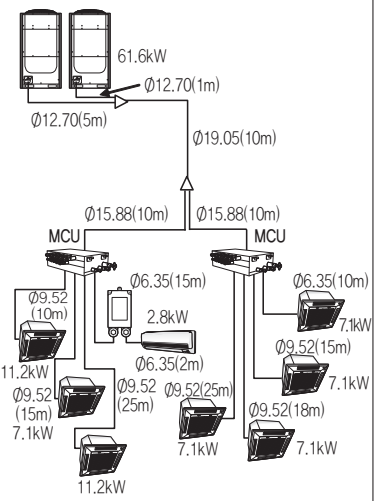
CAUTION

• The sum of the total capacity of the indoor units connected to a MCU should not be over the max. 44.8kW.

Simultaneous heating and cooling- Additional refrigerant

Additional refrigerant charging

• Example) Additional refrigerant charging



■ **Additional refrigerant is charged according to the length and size of liquid pipe.**

Liquid pipe size (O.D. mm)	Additional refrigerant charging (kg/m)
Ø6.35	0.02
Ø9.52	0.06
Ø12.70	0.125
Ø15.88	0.18
Ø19.05	0.27
Ø22.23	0.35
Ø25.40	0.53

■ **The amount of the refrigerant that is already placed in**

Classification	8HP	10HP	12HP	14HP	16HP	18HP	20HP
Standard	5.0	5.0	5.0	7.0	7.0	8.5	8.5

Additional refrigerant charging of MCU kit	(kg/unit)
Additional refrigerant charging of MCU is 0.5kg for every MCU kit	0.5

Additional refrigerant charging of distribution kit (kg/m)		Remarks
Regardless of the liquid pipe size, additional refrigerant charging is 0.01kg per meter after distribution kit	0.01	For wall-mounted & ceiling indoor unit

■ **Charge the additional refrigerant according to the indoor unit capacity. The amount of the additional refrigerant charging for each indoor unit capacity = 0.046kg/kW**

■ **The method to calculate the total amount of the refrigerant.**

- The amount of the refrigerant according to the pipe size and length (ⓐ)
- The amount of additional refrigerant charging for each indoor unit (ⓑ) = ∑ (Indoor unit capacity) x 0.046
- The amount of other additional refrigerant charging (ⓒ) = ∑(The number of MCU Kit installed) x 0.5
- The total amount of the additional refrigerant charging = ⓐ+ⓑ+ⓒ

■ **Example of additional refrigerant charging. Pipe length is as below.**

Liquid pipe size (O.D. mm)	Ø6.35	Ø9.52	Ø12.70	Ø15.88	Ø19.05
Length (m)	25	101	6	20	10

MCU	Pipe length after distribution kit (m)
2 Ea	2

❊ ⓐ = 25x0.02 +101x0.06 + 6x0.125 + 20x0.18 + 10x0.27 = 13.61kg
ⓑ = (11.2x2 + 7.1x5 + 2.8x1)x0.046 = 2.7922kg
ⓒ = 2x0.01 + 2x0.5 = 1.02
The total amount of the additional refrigerant charging :
ⓐ+ⓑ+ⓒ = 13.61 + 2.792 + 1.02 = 17.422kg

❊ Total refrigerant amount of the system must be less than 100kg.
If total refrigerant amount of system is over 100kg, the system has to be divided into smaller system, each containing less than 100kg.
ex) 20HP outdoor refrigerant is already charged 8.5kg, so the additional refrigerant must not be over 91.5kg.

CAUTION

• Total amount of refrigerant in the system must be less then 100kg. If total amount of refrigerant in the system is over 100kg, the system has to be divided into smaller system, each containing less than 100kg.

Refrigerant piping works

Method and cautions on brazing the pipe

Keeping refrigerant pipe clean and dry

▶ To prevent foreign materials or water from entering the pipe, it is important to keep the refrigerant pipe clean, dry and sealed during installation.

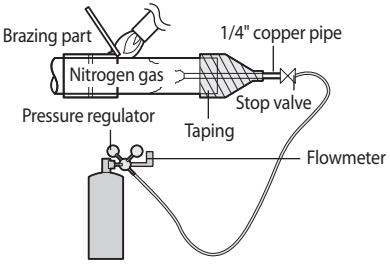
Exposure place	Exposure time	Sealing type
Outside exposure	Longer than one month	Pipe pinch
	Shorter than one month	Taping
Inside exposure	-	Taping

Brazing the pipe

▶ Make sure that there is no moisture inside the pipe.
▶ Make sure that there are no foreign materials and impurities in the pipe.
▶ Make sure that there is no leak.
▶ Make sure to follow the instruction when brazing the pipe.

The use of Nitrogen gas

1. Use Nitrogen gas when brazing the pipes as shown in the picture.
2. If you don't use Nitrogen gas when brazing the pipes, oxide may form inside the pipe. It can cause the damage of the compressor and valves.
3. Adjust the flow rate of the nitrogen gas with a pressure regulator to maintain 0.05m^3/h or less.



Direction of the pipe when brazing

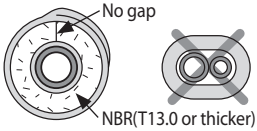
- Performing the brazing of the pipe should be headed downwards or horizontally.

Method and cautions on refrigerant pipe insulation

Make sure to check for gas leakage before completing the installation (hose and pipe insulation) and insulate hoses and pipes when there is no sign of leakage.

1. **To avoid condensation problems, place T13.0 or thicker Acrylonitrile Butadien Rubber separately around each refrigerant pipe.**

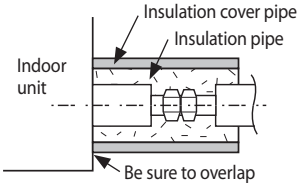
NOTE
- Always make the seam of pipes face upwards.



2. **Wind insulating tape around the pipes and drain hose avoiding to compress the insulation too much.**

3. **Finish wrapping insulating tape around the rest of the pipes leading to the outdoor unit.**

4. **The pipes and electrical cables connecting the indoor unit with the outdoor unit must be fixed to the wall with suitable ducts.**



CAUTION
- All refrigerant connection must be accessible, in order to permit either unit maintenance or removing it completely.

CAUTION
- Must fit tightly against body without any gap.

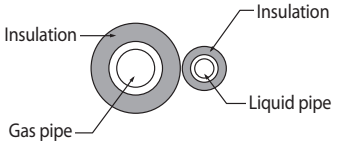
5. Select the insulation of the refrigerant pipe.

- ▶ Insulate the gas side and liquid side pipe referring to the thickness according to the pipe size.
- ▶ Indoor temperature of 30°C and humidity of 85% is the standard condition. If install in a high humidity condition, use one grade thicker insulator by referring to the table below. If installing in an unfavorable conditions,use thicker one.
- ▶ Insulator's heat-resistance temperature should be more than 120°C.

Pipe	Pipe size	Insulation Type(Heating/Cooling)		Remarks
		Standard [30°C, 85%]	High humidity [30°C, over85%]	
		EPDM, NBR		
Liquid pipe	ø6.35~ø9.52	9t	9t	Internal temperature is higher than 120°C
	ø12.70~ø50.80	13t	13t	
Gas Pipe	ø6.35	13t	19t	
	ø9.52	19t	25t	
	ø12.70			
	ø15.88			
	ø19.05			
	ø22.23			
	ø25.40			
	ø28.58		32t	
	ø31.75			
	ø38.10			
	ø44.45			
	ø50.80	25t	38t	

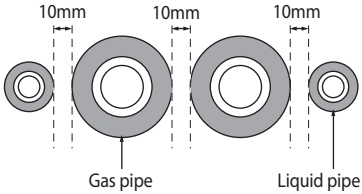
Refrigerant pipe before EEV kit and MCU or without EEV kit and MCU

- ▶ You can contact the gas side and liquid side pipes but the pipes should not be pressed.
- ▶ When contacting the gas side and gas side pipe, use 1 grade thicker insulator.



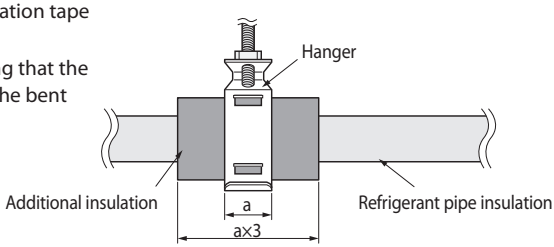
Refrigerant pipe after EEV kit and MCU

- ▶ Install the gas side and liquid side pipes, leave 10mm of space.
- ▶ When contacting the gas side and liquid side pipe, use 1 grade thicker insulation.



CAUTION

- Install the insulation not to get wider and use the adhesives on the connection part of it to prevent moisture from entering.
- Wind the refrigerant pipe with insulation tape if it is exposed to outside sunlight.
- Install the refrigerant pipe respecting that the insulation does not get thinner on the bent part or hanger of pipe.
- Add the additional insulation if the insulation plate gets thinner.

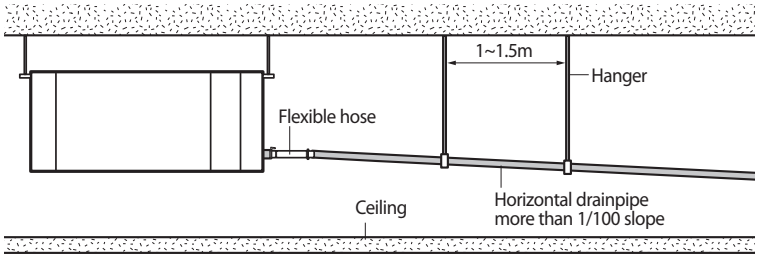


Refrigerant piping works

Draining form

Without the drain pump

1. Install horizontal drainpipe with a slope of 1/100 or more and fix it by hanger space of 1.0~1.5m.
2. Install U-trap at the end of the drainpipe to prevent a nasty smell to reach the indoor unit.
3. Do not install the drainpipe to upward position. It may cause water flow back to the unit.

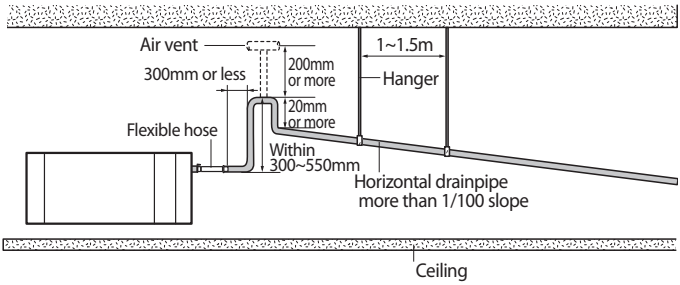


With the drain pump

1. The drain pipe should be installed within 300mm to 550mm from the flexible hose and then lift down 20mm or more.
2. Install horizontal drainpipe with a slope of 1/100 or more and fix it by hanger space of 1.0~1.5m.
3. Install the air vent in the horizontal drainpipe to prevent water flow back to the indoor unit.

NOTE
- You may not need to install it if there were proper slope in the horizontal drainpipe.

4. The flexible hose should not be installed upward position, it may cause water flow back to the indoor unit.



Wiring works

Installing the circuit breaker and wires

Power supply	MCCB	ELB	Power cable	Earth cable	Communication cable
Max : 242V Min : 198V	X A	X A, 30mmA 0.1 sec	2.5mm^2	2.5mm^2	0.75~1.5mm^2

▶ Decide the capacity of ELB and MCCB by below formula.

The capacity of ELB, MCCB X[A] = 1.25 X 1.1 X ∑Ai

❉ X : The capacity of ELB, MCCB

❉ ∑Ai : Sum of Rating currents of each indoor unit.

❉ Refer to each installation manual about the rating current of indoor unit.

▶ Decide the power cable specification and maximum length within 10% power drop among indoor units.

$$\sum_{k=1}^{n}\left(\frac{Coef\times 35.6\times L_K\times i_K}{1000\times A_K}\right) < \text{10\% of input voltage[V]}$$

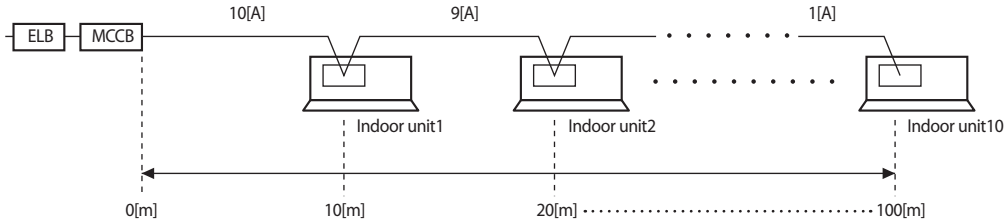
✳ Coef: 1.55

✳ L_K: Distance among each indoor unit[m], Ak: Power cable specification[mm^2]
i_K: Running current of each unit[A]

Example of Installation

▶ Total power cable length L = 100(m), Running current of each units 1[A]

▶ Total 10 indoor units were installed

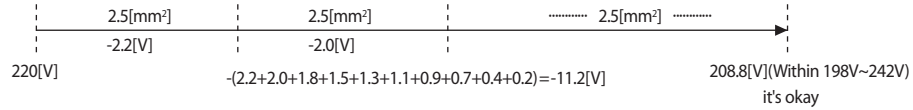


▶ Apply following equation.

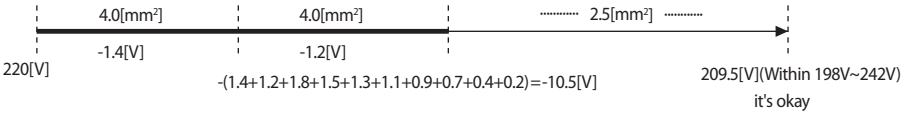
$$\sum_{k=1}^{n}\left(\frac{Coef\times 35.6\times L_K\times i_K}{1000\times A_K}\right) < \text{10\% of input voltage[V]}$$

❉ Calculation

- Installing with 1 sort wire



- Installing with 2 different sort wire



❉ If the terminal input pressure of the indoor unit goes down by more than 10%, install the thicker wire.

Wiring works

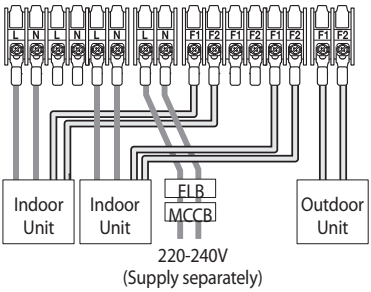
Rated current

Unit	Model	Rating current (A)
AVXCS✳✳	✳✳022✳✳	0.20
	✳✳028✳✳	0.23
	✳✳036✳✳	0.25
AVXC2✳✳	✳✳052✳✳	0.38
	✳✳056✳✳	0.38
	✳✳060✳✳	0.40
	✳✳071✳✳	0.40
	✳✳072✳✳	0.40
ND✳✳✳4✳✳✳	✳✳045✳✳	0.15
	✳✳056✳✳	0.15
	✳✳071✳✳	0.21
	✳✳090✳✳	0.30
	✳✳112✳✳	0.36
	✳✳128✳✳	0.36
	✳✳140✳✳	0.45
AVXCM✳✳	✳✳028✳✳	0.50
	✳✳036✳✳	0.50
	✳✳056✳✳	0.52
	✳✳071✳✳	0.55
AVXWV✳✳	✳✳022✳✳	0.13
	✳✳028✳✳	0.18
	✳✳036✳✳	0.19
	✳✳056✳✳	0.30
	✳✳071✳✳	0.30
AVXDS✳A	✳✳022✳✳	0.40
	✳✳028✳✳	0.40
	✳✳036✳✳	0.40
	✳✳040✳✳	0.60
	✳✳045✳✳	0.60
	✳✳056✳✳	0.60
	✳✳071✳✳	0.60
	✳✳090✳✳	1.00
	✳✳112✳✳	1.00
	✳✳128✳✳	1.20
	✳✳140✳✳	1.20
AVXDS✳P	✳✳071✳✳	0.96
	✳✳090✳✳	0.96
	✳✳112✳✳	0.96
	✳✳128✳✳	1.13
	✳✳140✳✳	1.24
AVXDU✳✳	✳✳056✳✳	1.10
	✳✳071✳✳	1.25
	✳✳090✳✳	1.30
	✳✳112✳✳	1.17
	✳✳128✳✳	1.62
	✳✳140✳✳	1.86
ND✳✳✳HH✳✳✳	✳✳200✳✳	3.30
	✳✳220✳✳	3.80
	✳✳280✳✳	5.90

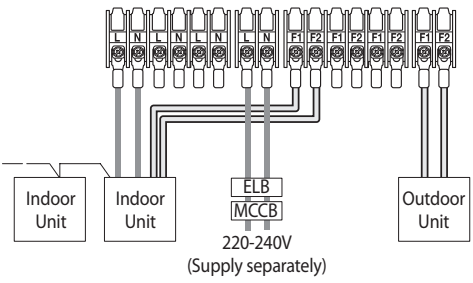
Installing the wire

▶ Supply the 220-240V power to L, N of MCU separately with outdoor unit.
▶ Connect the communication cable from the outdoor unit to F1, F2 of MCU.
▶ Power Line and communication line must be connected as shown in drawing.

Case 1

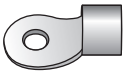


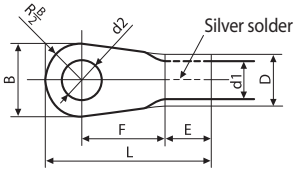
Case 2

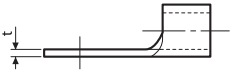


Input socket

▶ Choose the compressed socket based on the cross-section of the connecting wire.







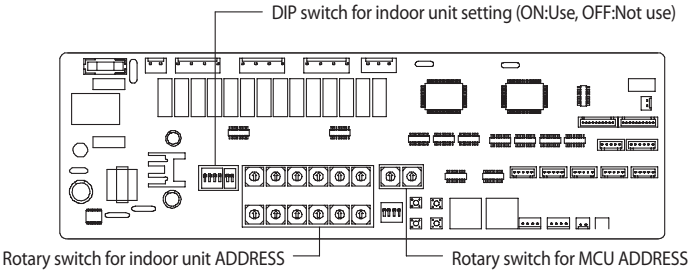
Norminal dimensions for cable (mm^2)	Norminal dimensions for screw (mm)	B		D		d1		E	F	L	d2		t
		Standard dimension (mm)	Allowance (mm)	Standard dimension (mm)	Allowance (mm)	Standard dimension (mm)	Allowance (mm)	Min.	Min.	Max.	Standard dimension (mm)	Allowance (mm)	Min.
1.5	4	6.6	±0.2	3.4	+0.3 -0.2	1.7	±0.2	4.1	6	16	4.3	+0.2 0	0.7
	4	8											
2.5	4	6.6	±0.2	4.2	+0.3 -0.2	2.3	±0.2	6	6	17.5	4.3	+0.2 0	0.8
	4	8.5											
4	4	9.5	±0.2	5.6	+0.3 -0.2	3.4	±0.2	6	5	20	4.3	+0.2 0	0.9

Wiring works

Setting address and option

PCB Layout

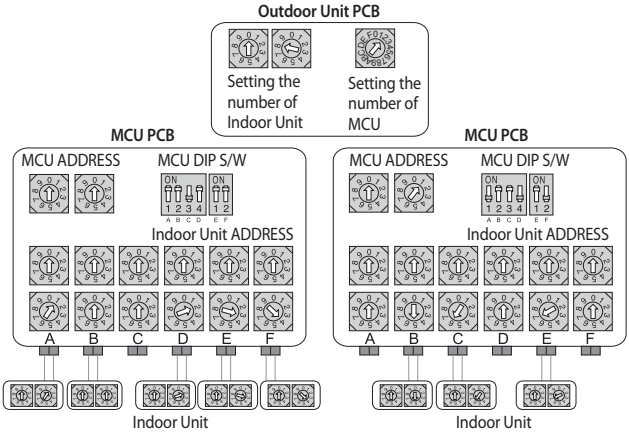
▶ Turn off the DIP switch on the MCU PCB when pipe is not connected.


DIP switch for indoor unit setting (ON:Use, OFF:Not use)
Rotary switch for indoor unit ADDRESS
Rotary switch for MCU ADDRESS

Setting MCU address

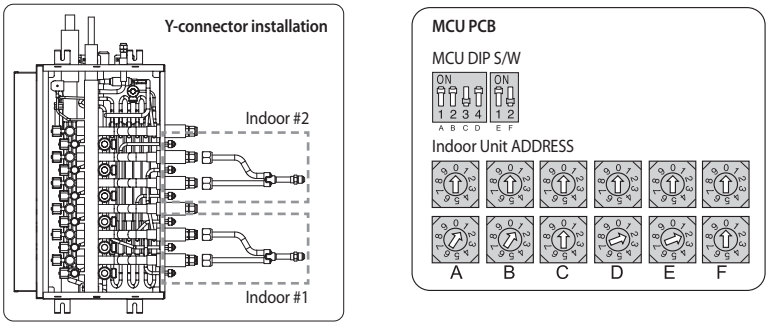
▶ Set the rotary switch of the indoor unit ADDRESS on the MCU PCB same as the ADDRESS of connected indoor unit.

▶ When installing more than 2 MCU, set each rotary switch for MCU ADDRESS properly.

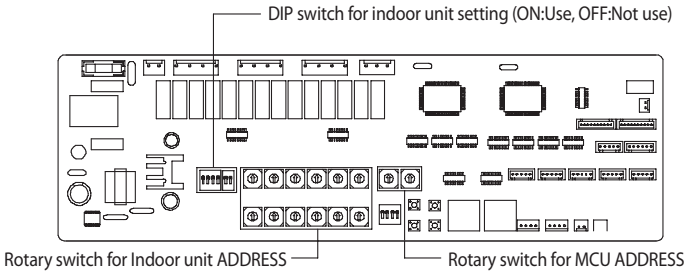


Connecting indoor with Y-Connector to MCU

▶ In case of connecting one indoor with Y-Connector to MCU, set the MCU address same about connected two indoors and set MCU DIP S/W using two indoors.



Setting MCU option


DIP switch for indoor unit setting (ON:Use, OFF:Not use)
Rotary switch for Indoor unit ADDRESS
Rotary switch for MCU ADDRESS

How to set up

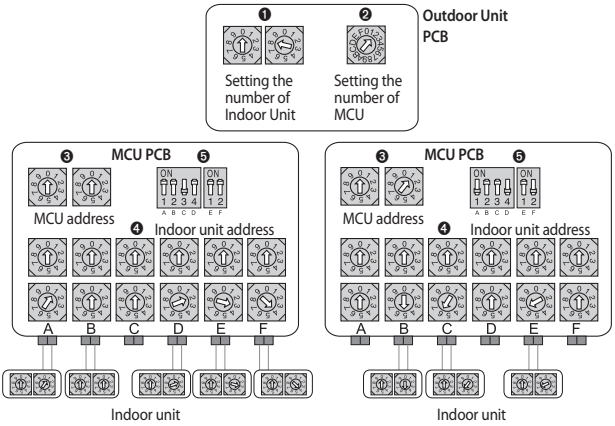
❶ Set the rotary switch located at outdoor unit PCB to match the number of connected indoor units (8).

❷ Set the rotary switch located at outdoor unit PCB to match the number of connected MCU (2).

❸ When installing more than 2 MCUs, set each rotary switch of MCU differently.

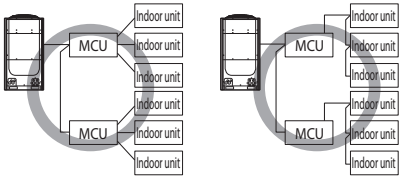
❹ Set rotary switch located at MCU PCB to match indoor unit address.

❺ Set the DIP switch of MCU to "OFF" position for the indoor units that is not connected.



CAUTION

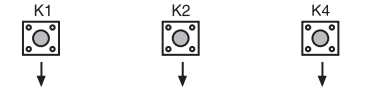
- Connect the power cable using the compressed ring terminal.



- Communication cables are connected as shown above when installing MCU.
- When installing electricity and wires of MCU, please proceed the work refering to the installation manual of the HR outdoor unit.

Wiring works

Key operation



K1 (Pushed time)	Display Contents	Display segment				Remarks
		1	2	3	4	
1	MCU address	0	Blank	0	0	MCU address 0
			Blank	0	1	MCU address 1
			Blank	0	2	MCU address 2
			Blank	1	1	MCU address 11
			Blank	1	5	MCU address 15
2	Mode switching EEV1 step	1	4	8	0	Ex) 480 steps
3	Mode switching EEV2 step	2	4	8	0	Ex) 480 steps
4	Mode switching EEV3 step	3	4	8	0	Ex) 480 steps
5	Mode switching EEV4 step	4	4	8	0	Ex) 480 steps
6	Mode switching EEV5 step	5	4	8	0	Ex) 480 steps
7	Mode switching EEV6 step	6	4	8	0	Ex) 480 steps
8	Subcooler EEV step	7	4	8	0	Ex) 480 steps
9	Subcooler-in sensor temperature	8	-	0	1	Ex) -1℃
			Blank	1	0	Ex) 10℃
10	Subcooler-out sensor temperature	9	-	0	1	Ex) -1℃
			Blank	1	0	Ex) 10℃
11	On/Off for solenoid valve A_C, A_H	A	-	• ✳_C : Cooling solenid valve of port ✳ • ✳_H : Heating solenid valve of port ✳ • 3rd segment : Cooling solenid valve On : 1 / Off : 0		
12	On/Off for solenoid valve B_C, B_H	B				
13	On/Off for solenoid valve C_C, C_H	C				
14	On/Off for solenoid valve D_C, D_H	D				
15	On/Off for solenoid valve E_C, E_H	E				
16	On/Off for solenoid valve F_C, F_H	F				
17	On/Off for liquid by pass solenoid valve	G	Blank	0	N	Ex) On
			0	F	F	Ex) Off
18	Version	8	A	2	0	Ex) October 20, 2008 → 8A 20
19	End of K1 display					

K2 (Pushed time)	Display Contents	Display segment				Remarks
		1	2	3	4	
1	Indoor unit main address for matching with port A	A	-	0	0	Indoor unit main address of port A : 0
2	Indoor unit main address for matching with port B	B	-	0	3	Indoor unit main address of port B : 3
3	Indoor unit main address for matching with port C	C	-	0	6	Indoor unit main address of port C : 6
4	Indoor unit main address for matching with port D	D	-	0	9	Indoor unit main address of port D : 9
5	Indoor unit main address for matching with port E	E	-	1	1	Indoor unit main address of port E : 11
6	Indoor unit main address for matching with port F	F	-	1	5	Indoor unit main address of port F : 15
7	End of K2 display					

K4 Switch (Electronic Valve Manual Control)

- ▶ According to the push time of K4 Switch, A_C, A_H, …, F_C, F_H, Liquid bypass solenoid valve opens in order.
- ▶ In Electronic Valve Manual Control mode, valve operates by K4 Push time irrespective of indoor operation mode.
- ▶ In Electronic Valve Manual Control mode, push K1 Switch makes DATA DISPLAY MODE to start and valves will operate following indoor operation mode.

K4 (Push time)	Display Contents	Display segment			
		1	2	3	4
1	A_C sol valve ON, other sol valve Off	P	A	1	0
2	A_H sol valve ON, other sol valve Off	P	A	0	1
3	B_C sol valve ON, other sol valve Off	P	B	1	0
4	B_H sol valve ON, other sol valve Off	P	B	0	1
5	C_C sol valve ON, other sol valve Off	P	C	1	0
6	C_H sol valve ON, other sol valve Off	P	C	0	1
7	D_C sol valve ON, other sol valve Off	P	D	1	0
8	D_H sol valve ON, other sol valve Off	P	D	0	1
9	E_C sol valve ON, other sol valve Off	P	E	1	0
10	E_H sol valve ON, other sol valve Off	P	E	0	1
11	F_C sol valve ON, other sol valve Off	P	F	1	0
12	F_H sol valve ON, other sol valve Off	P	F	0	1
13	Liquid b/p sol valve ON, other sol valve Off	P	S	0	1
14	sol valve Manual Control MODE end	P	Communication DATA Display		

Commisioning

❉ **After installing MCU, check those items below. If you find something unfulfilled, refer to the manual to complete it.**

Item	Check
1. If the gas leaking test has been completed or not.	
2. If MCU has been fixed securely enough to avoid the danger of vibration and falling or not.	
3. The Insulation condition of the pipe. (Refrigerant pipe, Pipe connection.)	
4. If the R410A refrigerant has been charged or not. If the subsidiary unit for R410A has been used or not.	
5. Checking malfunction of the wire and the communication line.	
6. If the MCU frame has been installed upside-down or not.	
7. If the wire earthing work has been done or not.	
8. If the space between sidewalls, ceiling concrete, and the ceiling Tex has been secured enough or not to install the MCU frame.	
9. If the supporting tool of the MCU pipe has been safely placed in 1.5m intervals or not.	
10. If the prescribed wire has been used or not.	
11. If the supplied power is proper or not.	
12. If the additional refrigerant is proper or not. (Refer to the installation manual of the HR outdoor unit.)	

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